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Non-Proliferation of Nuclear Weapons

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ACTIVITIES OF THE INTERNATIONAL ATOMIC ENERGY AGENCY RELEVANT TO ARTICLE III OF THE TREATY ON THE NON-PROLIFERATION OF NUCLEAR WEAPONS

Background Paper Prepared by the Secretariat of the IAEA

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ARTICLE III OF THE NPT

"1. Each non-nuclear-weapon State Party to the Treaty undertakes to accept safeguards, as set forth in an agreement to be negotiated and concluded with the International Atomic Energy Agency in accordance with the Statute of the International Atomic Energy Agency and the Agency's safeguards system, for the exclusive purpose of verification of the fulfilment of its obligations assumed under this Treaty with a view to preventing diversion of nuclear energy from peaceful uses to nuclear weapons or other nuclear explosive devices. Procedures for the safeguards required by this Article shall be followed with respect to source or special fissionable material whether it is being produced, processed or used in any principal nuclear facility or is outside any such facility. The safeguards required by this Article shall be applied on all source or special fissionable material in all peaceful nuclear activities within the territory of such State, under its jurisdiction, or carried out under its control anywhere."

"2. Each State Party to the Treaty undertakes not to provide: (a) source or special fissionable material, or (b) equipment or material especially designed or prepared for the processing, use or production of special fissionable material, to any non-nuclear-weapon State for peaceful purposes, unless the source or special fissionable material shall be subject to the safeguards required by this Article."

"3. The safeguards required by this Article shall be implemented in a manner designed to comply with Article IV of this Treaty, and to avoid hampering the economic or technological development of the Parties or international co-operation in the field of peaceful nuclear activities, including the international exchange of nuclear material and equipment for the processing, use or production of nuclear material for peaceful purposes in accordance with the provisions of this Article and the principle of safeguarding set forth in the Preamble of the Treaty."

"4. Non-nuclear-weapon States Party to the Treaty shall conclude agreements with the International Atomic Energy Agency to meet the requirements of this Article either individually or together with other States in accordance with the Statute of the International Atomic Energy Agency. Negotiation of such agreements shall commence within 180 days from the original entry into force of this Treaty. For States depositing their instruments of ratification or accession after the 180-day period, negotiation of such agreements shall commence not later than the date of such deposit. Such agreements shall enter into force not later than eighteen months after the date of initiation of negotiations."

Activities of the International Atomic Energy Agency Relevant to Article III of the Treaty on the Non-Proliferation of Nuclear Weapons

EXECUTIVE SUMMARY

1. States Party to the NPT rely on the IAEA to provide assurance of the compliance of other States Parties with their safeguards undertakings and to demonstrate their own compliance. The provision of such assurance through IAEA safeguards promotes further confidence among States and, as a fundamental element of the NPT, helps to strengthen States' collective security. Safeguards and other Agency activities related to nuclear material security also facilitate international nuclear trade and co-operation. For the last thirty years, the Agency has been able to provide credible assurance about the non-diversion of nuclear material which has been declared and placed under safeguards.

2. Safeguards have continually evolved, since their inception, to take account of changes in technology. Following the Gulf War, the shortcomings of the safeguards system became apparent and it was agreed that the system would have to provide assurance not only about the non-diversion of declared nuclear material and facilities but also about the absence of any undeclared nuclear material and activities. To do this, the system has needed to move beyond its traditional focus on nuclear material accountancy - essentially a quantitative audit system designed to keep track of material declared to the Agency - to a system based on more qualitative assessment. Such a system affords the Agency a better vantage point from which to develop a more comprehensive picture than before of all nuclear activities in a State and to detect and verify possible non-peaceful activities at an early stage. The strengthening of Agency safeguards has entailed developments in three major areas: more information, wider access and greater use of advanced technology.

3. The IAEA began to introduce new measures to strengthen safeguards in 1992. Some of the measures could be carried out by virtue of the authority conferred upon the IAEA in existing comprehensive safeguards agreements. Other measures required additional authority which was conferred upon the Agency through the Model Protocol Additional to safeguards agreements ("Model Additional Protocol") approved by the IAEA Board of Governors in May 1997 (INFCIRC/540 Corr.). The measures in the Model Additional Protocol are designed to provide the Agency with as comprehensive a picture as is practicable about a State's nuclear material and activities and additional physical access to places where nuclear material is, or could be, present. The underlying rationale is that the more that is known about a State's nuclear activities and plans, the more comprehensive the verification process can be and the more robust the assurances derived therefrom.

4. The 1995 NPT Review and Extension Conference adopted a number of "Principles and Objectives" relating to Agency safeguards. In paragraph 9 of that document, the States Parties confirmed that the IAEA is the competent authority to verify and assure States' compliance with their safeguards agreements. The IAEA has continued to function as such. Paragraph 10 of the same document notes that all States Parties are required to bring into force comprehensive safeguards agreements. Since the 1995 Conference, 28 States Parties to the Treaty have concluded and brought into force safeguards agreements which satisfy the requirements of the NPT, bringing the total number of States with Treaty safeguards

agreements in force to 127 as of 1 January 2000. However, there remain 55 States Parties which have not yet brought into force the safeguards agreement which the Treaty requires of them.

5. Paragraph 11 of the "Principles and Objectives" supported strengthening the effectiveness of the safeguards system. Given the importance attributed in that paragraph to supporting and implementing decisions adopted by the Board of Governors aimed at further strengthening the effectiveness of safeguards, progress in concluding Additional Protocols has been disappointingly slow. In this context, it is important to note that the Agency's ability to implement fully the safeguards required by Article III of the Treaty depends not only on all the relevant safeguards agreements being in place, but also on the conclusion of Additional Protocols. This is because it is only with respect to States which have both a comprehensive safeguards agreement and an Additional Protocol that the Agency will be able to provide credible assurances about the non-diversion of nuclear material and the absence of undeclared nuclear material and activities.

6. Paragraph 13 of the "Principles and Objectives" stated that fissile material transferred from military use to peaceful nuclear activities should, as soon as practicable, be placed under IAEA safeguards in the framework of the Voluntary Offer safeguards agreements in place with the nuclear-weapon States (NWSs). Ten tonnes of highly enriched uranium and two tonnes of plutonium are currently under safeguards in the United States of America. In addition, the Agency is making arrangements for the down-blending of some 50 tonnes of high enriched uranium deemed excess by the USA. The United Kingdom has also reduced its nuclear stockpile and has released significant fissile material inventories from military use. This material is now subject to EURATOM safeguards and is eligible for IAEA safeguards under the United Kingdom's Voluntary Offer Agreement, contingent on adequate resources.

7. Over and above these efforts, in September 1996, the United States of America and the Russian Federation launched a joint initiative concerning Agency verification of weapon-origin fissile material in the USA and the Russian Federation. The Parties are addressing the various technical, legal and financial issues involved and work is ongoing with regard to a framework verification agreement which would ensure that the fissile material is irrevocably removed from weapons programmes, and verification arrangements which would enable the Agency to draw independent and credible conclusions, while ensuring, in line with the States' obligations under Article I of the Treaty, that no classified information could be acquired by the inspectors.

8. In paragraph 19 of the "Principles and Objectives", the States Parties agreed that every effort should be made to ensure that the IAEA has the financial and human resources to meet its safeguards responsibilities effectively. Notwithstanding, IAEA Member States have continued to apply a policy of zero real growth to the IAEA's budget. The Agency has become increasingly dependent on voluntary, extrabudgetary contributions from Member States. In the projected budget for 2001, over 20% of the full cost of the safeguards programme lies outside the regular budget. Such heavy reliance on extrabudgetary funds is unsound and unsatisfactory.

9. Important aspects of IAEA safeguards since 1995 are the Agency's activities in Iraq and in the Democratic People's Republic of Korea (DPRK). From 1995 to 1998, the IAEA

continued monitoring and verification activities in Iraq pursuant to the relevant Security Council resolutions. Restrictions of rights imposed by Iraq on IAEA teams in the second half of 1998 resulted in a severely limited level of assurance about Iraq's compliance with the Security Council resolutions. On 16 December 1998, monitoring activities were suspended indefinitely. In January 2000 the Agency carried out an inspection pursuant to Iraq's NPT safeguards agreement.

10. The Agency is still unable to verify the initial report of nuclear material and facilities subject to safeguards in the DPRK and can accordingly provide no assurance about non-diversion. The DPRK remains in non-compliance with its safeguards agreement. It continues to link the extent of its co-operation with the Agency to progress in the implementation of the Agreed Framework between the DPRK and the United States of America.

11. The Agency has been involved in a variety of other safeguards-related issues since the 1995 NPT Review and Extension Conference. Progress was made in the conclusion of safeguards agreements related to nuclear-weapon-free zones (NWFZs). Efforts also continue with regard to the application of full-scope IAEA safeguards to all nuclear activities in the Middle East and a future NWFZ in that area. The Agency has also increased its efforts with regard to the security of nuclear material, for example through improving its database of illicit trafficking incidents. The recommendations for physical protection, published under IAEA auspices, were reviewed and strengthened in 1998.

12. The Agency has continued to devote substantial effort to strengthening the effectiveness and improving the efficiency of safeguards. One measure of effectiveness is inspection goal attainment. This has continued to improve gradually since 1995 but efforts are still required to solve some implementation problems. The efficiency of safeguards has also continued to improve. Efficiency, as measured by the cost of safeguards per significant quantity (SQ) of nuclear material, has been improved due largely to economies of scale. The implementation of the Additional Protocol is expected to increase further both the effectiveness and the efficiency of Agency safeguards.

13. Throughout the past five years, the Agency has continued to respect its obligations to: avoid hampering and undue interference in States' peaceful nuclear activities; protect commercial and industrial secrets and other confidential information; secure staff of the highest standards with due regard to geographical distribution; co-operate with State Systems of Accounting and Control; increase the transparency of safeguards; and provide effective and acceptable safeguards approaches for new and complex nuclear facilities.

14. The main focus of the on-going and future work is merging the existing nuclear material verification activities with the new strengthening measures or, in other words, the integration of safeguards. The aim is to optimize the combination of all the safeguards measures available to the Agency in order to meet the Agency's safeguards objectives with maximum effectiveness and efficiency.

15. States should provide all the necessary political, technical and financial support for all safeguards-related work of the IAEA. States can make a major contribution in a variety of ways, for example through supporting and implementing safeguards strengthening measures. Of key importance in this context is the conclusion of safeguards agreements and

Additional Protocols. States can also contribute to the Agency's safeguards work through: safeguards support programmes; timely, positive responses to inspector designation proposals and visa requests; the provision of logistical and other support; and ensuring high quality in their material accountancy data and declarations submitted pursuant to Additional Protocols.

I. SAFEGUARDS UNDER THE NPT

A. Safeguards as a Component of the Non-Proliferation Regime

16. Safeguards applied in accordance with Article III of the NPT are a form of institutionalized nuclear transparency through which the IAEA can verify that a non-nuclear-weapon State's nuclear activities are being used exclusively for peaceful purposes. However, IAEA safeguards are only one component of a wider set of measures designed to give assurance against the proliferation of nuclear weapons. They are directly connected to the legal instruments, such as the NPT, in which non-proliferation commitments are anchored and to the mechanisms for ensuring compliance, such as recourse to the Security Council. Other major component of the regime are: (i) national legislation and regulations aimed at preventing the proliferation of nuclear weapons; (ii) national and international nuclear export control systems; (iii) measures to ensure the physical protection of nuclear material and to guard against theft or unauthorized use; (iv) commitments not to test nuclear weapons or other nuclear explosive devices; and, most importantly, (v) regional accommodations (as reflected, inter alia, in nuclear-weapon-free zone (NWFZ) treaties) and steps towards nuclear disarmament. All of these components are mutually reinforcing.

17. The basic authority for the IAEA to apply safeguards derives from the provisions of the Statute of the IAEA, which entered into force in 1957. Article III.A.5 of the Statute authorises the Agency, inter alia, "to apply safeguards, at the request of the Parties, to any bilateral or multilateral arrangement".

18. With the entry into force in 1970 of the NPT, the IAEA was vested with the responsibility of assuring, through its safeguards system, compliance by non-nuclear-weapon States (NNWSs) Party to the Treaty with their safeguards obligations under the Treaty. In 1972, the Board of Governors approved the structure and content of a model comprehensive safeguards agreement pursuant to the NPT and requested the Director General to use it as a basis for negotiating safeguards agreements under the NPT. The relevant document (IAEA document INFCIRC/153 (Corr.)) is also regarded as the standard guideline for safeguards agreements under NWFZ treaties and other non-proliferation undertakings (e.g. the safeguards agreement concluded at the request of Argentina and Brazil). In addition, the five nuclear-weapon States (NWSs) have each accepted the application of Agency safeguards to all or part of their peaceful nuclear activities along the lines of INFCIRC/153 (the so called "Voluntary Offer Agreements").

B. Objectives of Safeguards

19. The objectives of NPT safeguards are to ensure that safeguards are applied to all nuclear material in all peaceful nuclear activities of the NNWSs Parties to the Treaty and to assure the international community that NNWSs Parties are complying with their peaceful use undertakings. The Agency endeavours to fulfil these objectives through a system that is

designed to detect, in a timely manner, a diversion of significant quantities (SQ)[1] of nuclear material from peaceful nuclear activities to the manufacture of nuclear weapons or of other nuclear explosive devices and to deter such diversion by the risk of early detection. The system is based on the principle that a certain quantity of nuclear material is needed to manufacture a nuclear explosive device and that a certain length of time is required to convert that material into weapons-usable form.

C. Basic Features

20. The basic features of the original NPT safeguards system are: *nuclear material accounting* through which, on the basis of information provided primarily by the State, the Agency establishes an initial inventory of nuclear material in the State, and records subsequent changes to it; *containment and surveillance* measures to monitor access to and movement of nuclear material and *on-site inspections* during which Agency inspectors have the right and obligation to carry out a variety of measures (such as the examination of records; taking measurements and samples of nuclear material for IAEA analysis; and verifying the functioning and calibration of instruments) for the purpose of verifying the correctness of States' nuclear accountancy data and also the completeness of declarations related to their nuclear programmes. On-site inspection is its most important feature. Inspections are of three types: ad hoc, routine and special. Ad hoc and routine inspections constitute the bulk of inspections. They give the Agency access to nuclear material and operating records and to specified locations where nuclear material is or may be used or stored. Special inspections are exceptional and may be prompted by the State itself, or by the IAEA if it considers that information made available by the State is not adequate for the Agency to fulfil its responsibilities under the relevant safeguards agreement.

21. The safeguards system is based on impartiality and objectivity and assumes neither compliance nor non-compliance. Essentially an audit system, it can neither provide assurances about future compliance or intentions, nor ensure enforcement. Rather, in cases where the system functions as an alarm which can trigger other response mechanisms.

D. Strengthening Safeguards

22. The Background Paper which the IAEA prepared for the 1995 NPT Review and Extension Conference (NPT/CONF.1995/7) about its activities under Article III of the NPT made clear that, following the discovery of Iraq's clandestine enrichment and nuclear weapons programmes, the Agency embarked upon intensive efforts to strengthen its safeguards system. The aim has been to develop a system which can not only provide assurance about the non-diversion of **declared** nuclear material and facilities, but can also provide credible assurance about the absence of any **undeclared** nuclear material and activities. The 1995 Background Paper explained that the focus of these efforts has been on obtaining more information from States about their nuclear activities and plans, and on

[1] A significant quantity is the approximate quantity of any given type of nuclear material which, taking into account any conversion process involved, is required for the manufacture of a nuclear explosive device. The timely detection of diversion is a reference to the maximum time frame within which the Agency seeks to detect any diversion from peaceful use. For this quantification, the Agency looks at the "conversion times" required to convert different types of nuclear material into a nuclear explosive device.

greater access to locations at which nuclear material is or could be present. Early strengthening measures were described (such as the early provision of design information about nuclear facilities, a reporting scheme on imports and exports of nuclear material and certain non-nuclear material and equipment, and the affirmation by the IAEA Board of Governors of the Agency's right to conduct special inspections), and considerable coverage was given to the then on-going safeguards development programme ("Programme 93+2") designed to build on earlier measures to strengthen the Agency's information base about a State's nuclear material and activities and to provide for greater access. The paper explained that increased cost efficiency was also a focus of the Programme.

23. As foreseen at the time of the 1995 NPT Review and Extension Conference, the Director General of the IAEA submitted to the IAEA Board of Governors, shortly thereafter, a number of proposals for further strengthening measures. Some of the proposals could be carried out under the authority already contained in comprehensive safeguards agreements. Others required additional authority to be conferred by States upon the Agency. Measures in the former category, which were brought to the attention of the IAEA Board of Governors in June 1995, built on earlier ones through recourse to such information gathering techniques as environmental sampling, the use of remote monitoring equipment, and improved evaluation of all information available about a State's nuclear material and activities.

24. In June 1996, the Board of Governors decided to establish an open-ended Committee to negotiate a legal instrument that would provide the legal authority for certain other measures which did not fall within the existing legal authority. The Committee met four times (2-4 July and 1-11 October 1996; 20-31 January and 2-4 April 1997) and negotiated the text of the Model Protocol Additional to Safeguards Agreements ("Model Additional Protocol") which was approved at a special meeting of the Board of Governors in May 1997. The document is published as an Agency Information Circular, INFCIRC/540 (Corrected).

25. The Model Additional Protocol embodies powerful new tools to help the Agency to verify compliance with States' nuclear non-proliferation commitments and, in combination with the relevant safeguards agreement, provides for as complete a picture as practicable about: a State's production of and holdings of nuclear source material; activities for the further processing of nuclear material (whether for nuclear or non-nuclear use); and elements of the infrastructure which supports the States' current or planned nuclear fuel cycle. The voluntary reporting scheme mentioned in paragraph 22 above is in substance incorporated into the Additional Protocol as a legal obligation.

26. A NNWS which has concluded an Additional Protocol is obliged to provide the Agency with:

(a) information about, and inspector access to, all aspects of the State's nuclear fuel cycle, from uranium mines to nuclear waste and any other locations where nuclear material is present;

(b) information about, and access mechanisms related to, nuclear fuel cycle-related research and development;

(c) information about, and short-notice inspector access to, all buildings on a nuclear "site";

(d) information about the manufacture of nuclear-related items and also any exports of sensitive nuclear-related technologies, and mechanisms for physical access to relevant locations in this regard;

(e) information about a State's long-term plans for the development of the nuclear fuel cycle;

(f) wider physical access than hitherto for inspection purposes and for the collection of environmental samples.

Provision is also made for:

(g) administrative arrangements, to rationalize safeguards administration through improving the process of inspector designations, the issuance of visas, wider use of IAEA regional offices, and enabling Agency inspectors to use the most up to date means of communications for transmitting safeguards-related data in a timely fashion.

27. The Model Additional Protocol represents a balance between rights and obligations of States and the Agency. While a State concluding an Additional Protocol incurs certain additional, legal obligations, the other side of the coin is that States' rights are protected under the Model Additional Protocol through the Agency's obligation to:

(a) ensure that the broader access rights incorporated in the Model document are not applied in any mechanistic or systematic fashion, but on a selective basis to facilities or to other places where nuclear material is declared to be present (to assure the absence of any undeclared nuclear material or activities) and to resolve questions and inconsistencies;

(b) provide advance notice to the State in writing of requests for such access, referred to in the Additional Protocol as "complementary access", specifying the reasons for the request and the activities to be carried out;

(c) accept managed access upon request by the State, in order to prevent the dissemination of proliferation sensitive information or to protect proprietary or commercially sensitive information;

(d) hold prior consultations with the State, for example, to give the State an opportunity to clarify and facilitate the resolution of a question or inconsistency, before a request for complementary access is made, or, in connection with wide-area environmental sampling, as and when such environmental sampling is approved by the Agency's Board of Governors;

(e) inform the State in writing of the activities and results of activities carried out under the Additional Protocol and the conclusions it has drawn therefrom;

(f) agree on Subsidiary Arrangements with the State, if either the State or the Agency considers it necessary to specify in Subsidiary Arrangements how measures laid down in the Additional Protocol are to be applied; and

(g) maintain a stringent regime to ensure effective protection against disclosure of all commercial, technological and industrial secrets and other confidential information coming to the Agency's knowledge in the implementation of the Additional Protocol.

Moreover, the enhanced assurances about the peaceful nature of States' nuclear activities and compliance with their non-proliferation undertakings, which the Agency will be able to provide as a result of its implementation of the Additional Protocol, will benefit the States that are Party to it.

28. Following the adoption of the Model Additional Protocol by the Board of Governors in May 1997, the IAEA Secretariat began work on the infrastructure necessary for effective and efficient implementation. Guidelines for States on the information required under Article 2, and formats for providing it, were developed. Model language has also been formulated for use in Subsidiary Arrangements. Recently, specific guidelines were completed to take account of the particular circumstances of States which, according to the Secretariat's understanding, have little or no nuclear material or activities. Work continues on guidelines for complementary access - of considerable interest to States during the Board's Committee deliberations - and, very importantly, training courses continue to be designed or modified to equip Agency inspectors with the new skills they need with the shift, under the Additional Protocol, to a more qualitative type of assessment. Also important are all the measures which the Agency continues to take to enhance its information gathering, analysis and evaluation capabilities.

II. DECISIONS OF THE 1995 NPT REVIEW AND EXTENSION CONFERENCE WITH REGARDS TO SAFEGUARDS

29. In keeping with the mandate conferred by the Third Session of the Preparatory Committee for the 2000 NPT Review Conference, this paper focuses on the implementation of the outcome of the 1995 Review and Extension Conference in so far as relevant to Agency safeguards.

30. The 1995 NPT Review and Extension Conference adopted a number of "Principles and Objectives" relating to Agency safeguards. These are listed in Annex 1. The following commentary summarizes the progress made to date in the implementation of those Principles and Objectives.

III. IMPLEMENTATION OF THE 1995 CONFERENCE PRINCIPLES AND OBJECTIVES REGARDING IAEA SAFEGUARDS

A. IAEA as Competent Safeguards Authority

31. The IAEA has continued to function as the competent authority to verify and assure, in accordance with its Statute and its safeguards system, compliance with the safeguards agreements with States Parties in fulfilment of their obligations under Article III.1 of the Treaty.

B. Progress in the Entry into Force of Safeguards Agreements pursuant to the NPT

32. Annex 2 gives details about increases in the number of safeguards agreements in force with the Agency. Since 1 January 1995, 28 States Parties to the Treaty have brought into force safeguards agreements which satisfy the requirements of the NPT, bringing the total number of States with NPT safeguards agreements in force to 127 as of 1 January 2000. There are still 55 States Parties which have not yet met their obligation under the NPT to conclude a comprehensive safeguards agreement. None of them will have met the Article III.4 obligation for the entry into force of the required agreement within 18 months of becoming a Party to the NPT.

33. Annex 3 to this paper shows lists of States which have NPT safeguards agreements in force with the Agency, and States whose safeguards agreements have still not entered into force, despite promptings by the Agency.

C. Strengthening the Effectiveness of IAEA Safeguards

1. Measures within the Authority Conferred by Safeguards Agreements

34. Based on courses of action endorsed by the Board of Governors in 1992 and 1995, the Agency has conducted the following activities to strengthen its safeguards system consistent with the legal authority provided under INFCIRC/153.

Increased Access to Information from States

35. As described in paragraph 22 above, the strengthening measures introduced by the Agency prior to the 1995 Conference included: the early reporting of design information for new facilities and for modifications to existing facilities; simplified inspector designation procedures; and voluntary reporting of nuclear exports and imports and of specified non-nuclear material and equipment. To date, 44 of 49 States have responded and provided relevant information on new and modified facilities, and for these States Subsidiary Arrangements to safeguards agreements have been amended accordingly. Apart from the 8 States for which an Additional Protocol is in force, 27 States have agreed to simplified inspector designation procedures and 41 States and the European Atomic Energy Community (EURATOM) have contributed to the voluntarily reporting on imports and exports of nuclear material, and of certain specified equipment and non-nuclear material used in nuclear applications.

36. In response to Agency requests, 37 States have provided information on facilities and locations outside facilities that were closed down or decommissioned prior to entry into force of their safeguards agreements.

37. Descriptions of the nuclear fuel cycle, and other activities involving nuclear material have been received from 40 States. In cases where the relevant information has been provided, the IAEA has obtained greater clarity about the relevant States' nuclear programmes. This has facilitated the planning of verification activities and the subsequent interpretation of the results.

Environmental Sampling

38. Since the 1995 Conference and in the context of gathering further information about a State's nuclear activities, the Agency has carried out initial *environmental sampling*, to serve as a reference point for subsequent routine sampling at 12 of the 14 enrichment plants under safeguards. The analytical results of the samples taken gave technical indications of the nuclear activities performed at the relevant facilities, thus contributing significantly to the Agency's confidence about the absence of undeclared production of high enriched uranium at these facilities. The Agency has also carried out (up to the end of 1999) initial environmental sampling at 77 research installations with large hot cells in 40 States. For hot cells, environmental sampling results may confirm the declared activities, thereby providing increased assurance of the absence of undeclared activities, including undeclared reprocessing operations or ongoing operations in shut-down facilities.

Information about State Systems of Accounting and Control (SSAC)

39. Since 1995, the Agency requested States and other Parties to comprehensive safeguards agreements to provide information about: their State Systems of Accounting and Control (SSAC); closed-down and decommissioned facilities and locations outside facilities; their nuclear fuel cycle activities involving nuclear material; and planned nuclear facilities.

40. The Agency has received the SSAC information it had requested from most States with significant nuclear activities, from EURATOM and from the Brazilian-Argentine Agency for Accounting and Control of Nuclear Materials (ABACC). This information provides a basis for enhanced co-operation that could, inter alia, improve IAEA safeguards efficiency while preserving the requirement for the Agency to be able to draw its own, independent safeguards conclusions.

41. Based on the information provided by them, the Agency has started discussions with States and regional systems to identify areas where co-operation could be enhanced, taking into account the characteristics of the specific SSAC or regional system. Potential areas of enhanced co-operation are: (1) common safeguards training for IAEA and SSAC personnel; (2) joint safeguards equipment research, development and procurement; (3) common use of safeguards equipment by the IAEA and the relevant SSAC; and (4) the joint conduct of selected inspections.

Improved Analysis of Information

42. A system for the collection of information from open sources has been established by the Agency to supplement the safeguards information available within the IAEA Secretariat about States' nuclear and nuclear-related activities. Information from open sources contributes significantly to the knowledge about a State's nuclear programme and enhances the Agency's ability to verify that States declarations are correct and complete. The specialized software which is necessary to retrieve and handle the large amount of information available from open sources is available and in regular use.

43. As a corollary to its efforts to obtain further information about a State's nuclear activities and plans, the Agency has been seeking to enhance its capability to evaluate effectively that information. In 1996, an Information Review Committee, involving senior Agency management, was established to oversee the evaluation of information for each State. In 1997, the Agency began regular evaluations of all information available to it about States' nuclear programmes. These evaluations were followed up, where necessary, to clarify States' nuclear programmes and plans. The reviews are more comprehensive in cases where the State in question has not only concluded a safeguards agreement with the Agency, but has also an Additional Protocol in force, and has accordingly submitted the information required under the Protocol.

Short Notice Inspections

44. The Agency has been seeking to expand the use of its right under safeguards agreements to conduct a portion of routine inspections "without advance notification" i.e. at short notice. This is being developed in conjunction with Member States. Field tests have demonstrated the feasibility of such arrangements for verifying nuclear material flow. It is anticipated that recourse to such inspections could contribute towards eventual reduction in other safeguards activities in the field.

Advances in Safeguards Technology

45. The Agency has introduced the use of advanced technology in measurement and surveillance equipment, thereby improving safeguards effectiveness and efficiency. When the new equipment is operated in an unattended mode, it should be possible to reduce the frequency of inspections. Additionally, having completed field testing of new digital surveillance systems, the Agency has started replacing the older, analogue systems which have been shown to be less reliable and which require greater maintenance. By the end of 1999, 118 digital systems were in operation. In addition, in the Member States of EURATOM, 77 digital surveillance systems had been installed by the European Commission for joint use with the Agency.

46. Progress has been made in introducing the remote transmission of safeguards data. A number of successful field trials demonstrated the feasibility of monitoring certain safeguards relevant operations by remote means. By the end of 1999, remote monitoring was being implemented at 8 facilities in 5 States. The continued rate of implementation will depend on the availability of the necessary resources and on the cost-effectiveness of the remote monitoring, which depends on such factors as the type of facility, the verification approach and the location of the particular facility.

2. Progress with regard to Additional Protocols

47. As noted in paragraphs 24 to 28 above, the basis for strengthening the IAEA safeguards system, particularly with regard to the Agency's ability to detect undeclared nuclear material and activities, was laid by the Board of Governors approval of the Model Additional Protocol in May 1997.

48. The IAEA Secretariat has been seeking since then to urge all States to conclude Protocols Additional to their respective safeguards agreements. This would be a further manifestation of their nuclear non-proliferation commitments and more importantly would enable the Agency to implement fully its obligations under Article III. As of 1 January 2000, the Board of Governors had approved Additional Protocols with 46 States Parties, including the 15 Member States of the European Union. Of these, 8 had entered into force[2] and a further one was being applied provisionally[3] (see Annex 4). Consultations are proceeding with a number of other States. In this regard, it is disappointing that, despite frequent calls upon them to do so, fewer than one third of the States Party to the NPT have responded to the calls of the Board of Governors on strengthening safeguards with regard to the conclusion of Additional Protocols.

49. As previously stated, Additional Protocols build on other, key strengthening measures by further increasing Agency access to information about States' nuclear and nuclear fuel cycle related activities and also by making provision for increased access to locations in States where nuclear material could be present. Where a State has both a safeguards agreement and an Additional Protocol in force, it provides for the optimum combination of measures through which the Agency can provide enhanced assurance of both the non-diversion of nuclear material and of the absence of undeclared nuclear material and activities.

50. As a starting point, a State is required to submit information under Article 2 of its Additional Protocol and periodic updates of that information as prescribed in Article 3. These "expanded declarations" seek information, additional to that already given under the safeguards agreement, in order to achieve as complete a picture as is practicable about the State's nuclear material and programmes. The document contains provisions which enable the Agency to request subsequent amplifications or clarifications to the information provided. Additionally, if other sources of information available to the Agency appear to be at variance with the State's declarations, the Agency may seek additional information and/or request "complementary access" to the relevant location(s) in the State to help resolve any question or inconsistency which it has identified and has brought to the attention of the State. States are entitled to receive advance notice of all complementary access visits as specified in the Additional Protocol.

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[2] Australia, Holy See, Indonesia, Japan, Jordan, Monaco, New Zealand, Uzbekistan

[3] Ghana

51. By 31 December 1999, the Agency had received information pursuant to Article 2 from 6 States with Additional Protocols in force.

52. The safeguards development programme initially known as "Programme 93+2" was conceived against the backdrop of undeclared nuclear activities in a State with a comprehensive safeguards agreement with the IAEA. It was nevertheless recognized early on in the Programme that the implementation of certain safeguards strengthening measures in other States (i.e. the NWSs and those States with item-specific safeguards agreements[4]) could (1) enhance the effectiveness of safeguards implementation in States with a comprehensive safeguards agreement; and also (2) improve the effectiveness and efficiency of the safeguards implementation in NWSs and in "INFCIRC/66" States themselves. This is why the Foreword to that document requests the Director General to negotiate Additional Protocols with other States that are prepared to accept measures provided for in the Model document so as to contribute to the safeguards effectiveness and efficiency aims of the Protocol.

53. Each of the NWSs indicated, during the 15 May 1997 special meeting of the Board of Governors, which of the measures in the model text it was prepared to accept. The Board, and the open-ended Committee of the Board that negotiated the Model document, expressed their expectation that adoption of the Additional Protocol in States with comprehensive safeguards agreements (the Additional Protocol in its entirety) and in States having non-comprehensive safeguards agreements (selected measures) would maintain "a certain degree of parallelism". Additional Protocols with four of the NWSs Parties to the Treaty[5] and with one "INFCIRC/66-State"[6] have been signed.

D. Nuclear Fissile Material transferred from Military Use to Peaceful Nuclear Activities

54. The 1995 "Principles and Objectives", inter alia, called for nuclear fissile material transferred from military use to peaceful nuclear activities to be placed under IAEA safeguards as soon as practicable in the framework of the Voluntary Offer safeguards agreements in place in the NWSs. Following the decision of the United States of America, first promulgated in September 1993, to submit nuclear material deemed not to be needed for military programmes to Agency safeguards, the Agency was requested to begin verification of 10 tonnes of stored highly enriched uranium at one facility in the USA. The amount of material placed under safeguards has now increased and includes plutonium at two additional storage facilities. In addition, the Agency has started the verification of the down-blending of some 50 tonnes of excess highly enriched uranium in the USA.

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[4] Safeguards agreements concluded on the basis of Agency document INFCIRC/66 Rev. 2 with States which have not undertaken any comprehensive non-proliferation commitments. Such agreements specify the specific material/items to be safeguarded.

[5] China, France, United States of America, United Kingdom. An Additional Protocol with the Russian Federation is expected to be submitted to the Board of Governors shortly.

[6] Cuba

55. In September 1996, the United States of America and the Russian Federation launched a joint initiative concerning Agency verification of weapon-origin fissile material in the USA and the Russian Federation. A new verification system was considered to be necessary to ensure that fissile material submitted for verification is irrevocably removed from nuclear weapons programmes, and to take account of special characteristics of material submitted. Over the past three and half years, the three Parties have been addressing the various technical, legal and financial issues involved. Work is continuing on the preparation of a model verification agreement and on verification arrangements. These arrangements must enable the Agency to verify nuclear material while not disclosing any information that would be in violation of the relevant States' obligations under Article I of the NPT.

56. Over and above these developments, the United Kingdom has unilaterally reduced its nuclear forces and has released significant fissile material inventories from military use. These fissile materials are now subject to EURATOM safeguards, and are also eligible for submission to IAEA safeguards under the United Kingdom's Voluntary Offer Safeguards Agreement.

F. IAEA Resources to Meet its Safeguards Responsibilities

57. Past NPT Conferences, including the 1995 Conference, have recognized the need for the IAEA to be provided with the necessary financial and human resources "to ensure that the Agency is able to meet effectively its responsibilities". Notwithstanding, despite the increase in the amount of nuclear material placed under IAEA safeguards, and in the number and complexity of facilities to be safeguarded, IAEA Member States have applied a policy of zero real growth to the IAEA's budget, which has shown only minuscule increases in limited areas since 1985. Insofar as safeguards are concerned, Member States have supplemented these resources with voluntary contributions in the form of expertise, equipment and analytical services. In the projected budget for 2001, over 20% of the full cost of the safeguards programme lies outside of the regular budget. The Agency's reliance on extrabudgetary funds makes planning increasingly difficult and limits the ability to prioritize work in an efficient and effective manner. Further details on workload and resources are presented in Section VI below.

IV. OTHER ASPECTS OF IAEA SAFEGUARDS SINCE 1995

A. Iraq

58. In 1991, following the discovery of Iraq's clandestine enrichment and nuclear weapons programmes, the United Nations Security Council adopted Resolutions 687, 707 and 715. Collectively, these resolutions call, inter alia, for Iraq unconditionally to agree not to acquire or develop nuclear weapons or nuclear-weapons-usable material or any subsystems or components or any research, development, support or manufacturing facilities related to the above; to submit to the Secretary-General of the United Nations and to the Director General of the IAEA a declaration of the locations, amounts, and types of all of the items specified; to halt all nuclear activities of any kind, except for use of isotopes for medical, agricultural or industrial purposes; to place all of its nuclear-weapons-usable material under the exclusive control of the IAEA, for custody and removal; and to accept

on-site inspection and the destruction, removal or rendering harmless, as appropriate, of all specified items and materials.

59. The Security Council approved the plans, developed by the Director General, to carry out these steps, including the plan for the Ongoing Monitoring and Verification of Iraq's compliance with the above.

60. Details about Agency activities in Iraq up to the time of the 1995 NPT Review and Extension Conference were given in the Background Paper in NPT/CONF.1995/7. By September 1994, major elements of the IAEA's Ongoing Monitoring and Verification plan had been set in place, including continuous Agency presence in Iraq. Monitoring activities included short notice inspections, environmental sampling, remote surveillance, as well as the constant follow-up on the clarification of remaining questions and concerns. An export-import monitoring system was also approved by the Security Council in Resolution 1051.

61. As a result of the IAEA inspection activities, a technically coherent picture of Iraq's clandestine nuclear programme has evolved - a programme aimed at the production of an arsenal of nuclear weapons, based on implosion technology. A detailed description of the Agency's achievements and Iraq's past programme is provided in the report of the Director General of the IAEA to the Security Council in October 1997 (S/1997/77).

62. The Agency activities relevant to the UN Security Council resolutions in Iraq have been suspended since the withdrawal of Agency personnel from Iraq on 16 December 1998. Some restrictions of rights imposed by Iraq to the Agency teams in 1998, like the denial of access to any sites other than those for which Iraq routinely provides declarations implied a significant decrease of the level of assurance that the Agency could provide to the international community. Since 16 December 1998, the Agency has not been able to implement its mandate in Iraq and, as a consequence, to provide any assurance that Iraq is in compliance with its obligations under the relevant resolutions.

63. UN Security Council Resolution 1284, adopted in December 1999, confirms the mandate of the Agency as defined by the previous resolutions. However, as of February 2000, the Agency has not yet been able to resume its related activities in Iraq.

64. During the time the IAEA was able to perform its mandate in Iraq pursuant to the above Security Council resolutions, the activities to be carried out by it in Iraq under the NPT safeguards agreements were subsumed under the more comprehensive and intrusive activities pursuant to the Security Council resolutions. In view of its inability to carry out Security Council-related activities since December 1998 and given its dual legal obligations pursuant to the NPT safeguards agreement, the Agency carried out an inspection in Iraq, in accordance with the NPT safeguards agreement, in January 2000 on the inventory of nuclear material remaining in the country.

B. Democratic People's Republic of Korea (DPRK)

65. The Agency remains unable to verify the correctness and completeness of the initial declaration of the DPRK of its nuclear material subject to safeguards and accordingly cannot provide any assurance about non-diversion. The DPRK remains in non-compliance with its safeguards agreement, and accepts the Agency activities solely within the context

of the Agreed Framework concluded between the United States of America and the DPRK in October 1994.

66. The Background Paper NPT/CONF.1995/7 described the Agency's activities in the DPRK up to January 1995. Since that time, the Agency has continued monitoring of the freeze and is maintaining a continuous inspector presence in the Nyongbyong area.

67. During 1996 the canning of the spent fuel rods which had been discharged from the DPRK's 5 MW(e) Experimental Nuclear Power Reactor in May 1994 was begun, without the safeguards measures requested by the IAEA in accordance with the DPRK's Safeguards Agreement. The Agency has not been allowed by the DPRK to make the required measurements of these rods. After some delays, the canning operations are nearing completion.

68. From 1995 to 1999, progress was made with regard to some safeguards measures required by the Agency but not others. For example, the DPRK agreed to more inspector designations, to arrangements for improved communication between Agency headquarters and inspectors, to the replacement of surveillance systems with digital surveillance, and to the installation of a monitoring system at one part of the DPRK's Radiochemical Laboratory (Reprocessing Plant). However, despite thirteen rounds of technical consultations between the Agency and the DPRK since 1994, no progress has been made on certain key issues, in particular the preservation of the information needed to enable the Agency to verify the DPRK's initial declaration of its nuclear material and facilities subject to safeguards. Other issues have also remained unresolved. For example, the DPRK has refused to allow the Agency to install equipment to monitor liquid nuclear wastes at the reprocessing plant to ensure that there is no movement or processing of such wastes. The DPRK has also declined to let the Agency conduct environmental sampling at any sites, including those facilities at which routine inspections are taking place. The DPRK continues to link the extent of its co-operation with the Agency to progress in the implementation of the Agreed Framework between the DPRK and the United States of America.

C. Nuclear-Weapon-Free Zones

69. Article VII of the NPT provides that, "Nothing in this Treaty affects the right of any group of States to conclude regional treaties in order to assure the total absence of nuclear weapons in their respective territories." Regional arrangements are a means through which confidence in and between the States of a specific region can be established and nurtured.

70. The 1995 Conference reaffirmed the conclusion that the establishment of internationally recognized nuclear-weapon-free zones (NWFZs), on the basis of arrangements freely arrived at among States of the region concerned, enhances global and regional peace and security. It encouraged, as a matter of priority, the development of further NWFZs by the year 2000, taking into account the characteristics of each region, and made clear that the co-operation of all the nuclear-weapon States and their support for the relevant protocols were necessary for the maximum effectiveness of NWFZs.

71. Document NPT/CONF.1995/7 noted that the treaty-based NWFZs then established or currently under negotiation provide for verification arrangements closely linked with safeguards implementation pursuant to the NPT. That situation continues to pertain.

72. Developments since the 1995 NPT Review and Extension Conference have resulted in the following situation with regard to States Party to regional nuclear-weapon-free zone agreements. Comprehensive safeguards agreements are in force with 31 of the 32 contracting States Party to the *Treaty for the Prohibition of Nuclear Weapons in Latin America* (the "Treaty of Tlatelolco"). All 11 States which are contracting Parties to the *South Pacific Nuclear Free Zone Treaty* (the "Treaty of Rarotonga") have met its requirement to bring into force comprehensive safeguards agreements which are pursuant to the NPT or equivalent in scope and effect. The *Treaty on the Southeast Asia Nuclear-Weapon-Free Zone* (the "Treaty of Bangkok") entered into force on 27 March 1997. Eight of the 10 contracting States Party to the Treaty of Bangkok have brought into force comprehensive safeguards agreements pursuant to the requirements of the treaty. The *African Nuclear-Weapons Free-Zone Treaty* (the "Pelindaba Treaty"), which was opened for signature on 11 April 1996 but has not yet entered in force, also requires States Party to bring into force comprehensive safeguards agreements. Six of the 8 States that have ratified the Pelindaba Treaty have comprehensive safeguards agreements in force. Negotiations among 5 States of the Central Asian region on a *Central Asian Nuclear-Weapon-Free Zone Treaty* began in 1997.

D. The Middle East

73. The 1995 NPT Conference, inter alia, adopted resolution NPT/CONF.1995/32/RES/1 which, inter alia:

> "Notes with concern the continued existence in the Middle East of unsafeguarded nuclear facilities, and reaffirms in this connection the recommendation contained in paragraph VI/3 of the report of Main Committee III urging those non-Parties to the Treaty which operate unsafeguarded nuclear facilities to accept full scope International Atomic Energy Agency safeguards" and
>
> "Calls upon all States in the Middle East to take practical steps in appropriate forums aimed at making progress towards, inter alia, the establishment of an effectively verifiable Middle East zone free of weapons of mass destruction, nuclear, chemical and biological, and their delivery systems, and to refrain from taking any measures that preclude the achievement of this objective."

74. Every year since the 1995 Conference, the IAEA General Conference has, in its turn, affirmed the need for all States in the Middle East to accept the application of full-scope safeguards to all their nuclear facilities[7] and called upon all Parties directly concerned to consider seriously taking the practical and appropriate steps required to establish a mutually

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[7] At present, with the exception of Israel, all States of the region have accepted comprehensive safeguards by virtue of being Party to the NPT. Some of these States, however, have not yet concluded the required safeguards agreement. Israel has accepted only an item-specific ("INFCIRC/66") safeguards agreement on one nuclear facility.

and effectively verifiable NWFZ in the region of the Middle East. In the latter connection, and in response to a request of the 1997 General Conference, the Agency held a third workshop on safeguards, verification technologies and other related experience in May 1998, with the aim of helping further to clarify, especially for States of the Middle East region, the choices, options and verification modalities which could feature in an eventual Middle East NWFZ agreement.

75. Since that time, the Director General of the Agency has continued his consultations with the countries in the Middle East, as requested by successive IAEA General Conferences, regarding general and specific aspects of the application of comprehensive safeguards to all nuclear facilities in the Middle East and to the preparation of model agreements relating to the verification of compliance with a future Middle East NWFZ Treaty. In this regard, in May 1999, the Director General wrote to the Foreign Ministers of States of the Middle East region seeking their views, in particular, on practical steps to foster a climate of confidence which could lead to the application of safeguards on all nuclear facilities in the region. He also sought their views on the geographical limitations of a future Middle East NWFZ and on the commitments which different groups of States might undertake within such a zone.

E. Nuclear Material Security

1. Illicit Trafficking in Nuclear Material

76. As stated in document NPT/CONF.1995/7, cases of illicit trafficking in nuclear materials have alarmed the international community for a number of years and are of particular concern to the Agency where the nuclear material involved is of safeguards relevance. States' concerns about the trafficking problem led to the adoption of a resolution, at the IAEA General Conference in September 1994, which called upon Member States "to take all necessary measures to prevent illicit trafficking in nuclear material" and invited the Director General "to intensify the IAEA's activities through which the Agency is currently supporting Member States in this area" and to prepare proposals for additional activities.

77. In March 1995, the Board approved proposals by the Director General for a programme to assist States in their efforts to prevent, detect and respond to illicit trafficking in nuclear materials and other radioactive sources. Building on earlier work within the Agency, the programme included the development of a reliable database of information on incidents of illicit trafficking, to help assist States combat trafficking and in order better to inform the public. The Agency's database became fully functional in 1997. In 1998, the Illicit Trafficking Database Programme was reviewed, improvements made and parameters were agreed for maintaining the confidentiality of the information reported.

78. As of 1 January 2000, 67 States were participating in the database programme. The database contains information on illicit trafficking incidents in chronological order, including, inter alia, measurement results and law enforcement actions. Periodically the Agency distributes summary reports to participating States. To date, the database contains details of some 369 trafficking incidents, 284 of which have been confirmed by States. Most of the incidents reported have involved low enriched, natural or depleted uranium and radioactive sources but some cases have involved limited quantities of highly enriched uranium or plutonium. Nuclear material recovered in trafficking is placed under Agency

safeguards. The continued reporting of trafficking bears witness to the fact that there continue to be deficiencies in the control of nuclear and other radioactive materials.

2. Physical Protection

79. At the 1995 NPT Conference, States Parties to the Treaty noted the paramount importance of effective physical protection of nuclear material and of observing guidelines and standards in this area.

80. In 1998, the IAEA Secretariat and 35 Member States completed a review of the recommendations for the physical protection of nuclear material elaborated under IAEA auspices[8]. These recommendations are widely accepted as the international standards for physical protection. The review resulted in strengthened recommendations for the protection of nuclear material in transport, use and storage and for the protection of nuclear facilities against the threat of sabotage. The Agency is carrying out a programme to help States implement these recommendations. It includes staff training in implementing nuclear material control and physical protection and providing technological support for the upgrading of physical protection in several States.

81. Since 1995, the Secretariat has been organizing, upon request, International Physical Protection Advisory Service (IPPAS) missions to review States' physical protection systems, assess whether they meet international standards, and make suggestions for improvement where necessary. These missions have provided a mechanism through which the Agency can convey information about needs of assistance to States willing to provide it. To date, IPPAS missions have been dispatched to 8 States.

82. In 1997 the Agency convened a Conference on the Physical Protection of Nuclear Material: Experience in Regulation, Implementation and Operation. Key points arising in the presentations and discussions included: (a) the continuing need to review and upgrade elements of physical protection systems, particularly the security of old facilities; (b) the desirability of using, where practical, the advanced technologies becoming available; and (c) the need to continue bilateral and multilateral exchanges of experience and information.

83. There are now 64 Parties to the Convention on the Physical Protection of Nuclear Material, 10 States having become Parties thereto since the 1995 Conference. In November 1999, as requested by some States Party to the Convention, the Director General convened an informal, open-ended expert meeting to discuss whether there is a need to revise the Convention. The meeting decided that a more detailed examination of a number of issues (e.g. nature, scale and implications for physical protection, of illicit trafficking) was needed prior to any conclusions being drawn about the need to revise the Convention. The expert meeting is to complete its deliberations, and report thereon to the Director General by mid-2001.

F. The Proliferation Potential of Neptunium and Americium

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[8] The Physical Protection of Nuclear Material and Nuclear Facilities (INFCIRC/225/Rev.4.)

84. As a result of the increased awareness of the proliferation potential of neptunium (Np) and americium (Am), and emerging projects in peaceful nuclear programmes which could result in an increase in the available quantities of separated Np and Am, the Director General submitted a document on the issue to the Board of Governors in November 1998. Article II of the NPT proscribes the use by NNWSs Party to the Treaty of any material to manufacture a nuclear weapon or other nuclear explosive device. Thus, the fact that Np, and with considerably greater difficulty, Am, if available in sufficient quantities in separated form, could be used to manufacture nuclear explosive devices, is relevant in the context of Article II and III of the Treaty, notwithstanding that neither Np nor Am are currently defined as "source or special fissionable material" in terms of Article XX of the Agency's Statute.

85. The Board considered the item at length at its meetings in December 1998, and March and June and finally September 1999. The options for action put forward by the Secretariat, comprised (1) amending Article XX of the IAEA Statute to include Np and Am in the definitions of "source or special fissionable material"; (2) implementing, with the voluntary co-operation of States, measures to monitor stocks of separated Np and Am and to institute certain technical measures known as "flow sheet verification" at relevant facilities with a view to be able to draw conclusions as to whether Np or Am were being separated; or (3) taking no action at this time. The Board concluded that designating Np and and/or Am as "nuclear material" would be premature, given the small amounts currently known to be available in separated form, and that doing nothing could undermine credibility of the safeguards system.

86. In September 1999 the Board decided to authorize the implementation of the second option for the monitoring of Np. By the end of 1999 the Agency had initiated an exchange of letters with relevant States to put the receipt of information about Np and the application of monitoring measures on an established footing. With regard to Am the Board concluded that at present there is practically no proliferation risk, but asked the Director General to report relevant developments as to the availability of the material and programmes in States which may lead to acquisition of such material.

V. REVIEW, RESPONSIVENESS AND ASSESSMENT

A. Safeguards Effectiveness

87. Previous NPT Conferences, including the 1995 Conference, have stressed the importance of strengthening the effectiveness of safeguards. Effectiveness in respect of declared nuclear material is represented, inter alia, by the extent to which inspection goals are attained as reported each year in the Agency's Safeguards Implementation Report (SIR). The Agency's Safeguards Criteria comprise an extensive set of inspection activities which, if performed successfully, can detect diversion should it occur. In instances of non-attainment of inspection goals, all relevant factors are carefully assessed as part of the process of drawing the overall annual safeguards conclusion.

88. As reported in document NPT/CONF.1995/7, since the first SIR was produced in 1977, inspection goal attainment for nuclear facilities has increased significantly compared

with the 17% in 1977. Between 1995 and 1998, there has been a further improvement in the goal attainment for nuclear facilities from 73% to 82%.

89. In keeping with the findings of previous NPT Conferences, the Agency continues to give priority to implementing safeguards on "unirradiated direct use" nuclear material, i.e. plutonium and highly enriched uranium from which nuclear weapons could readily be made. By 1998, the attainment of the quantity component of the inspection goal for such material had increased from 79 % in 1995 to 86 % of the facilities with such materials. This also reflects, inter alia, the considerable amount of work that the IAEA has undertaken to ensure the continuing effectiveness of safeguards at reprocessing facilities and at facilities for the storage and use of separated plutonium.

90. In the SIR for 1998, the Agency for the first time reported the limited results of Additional Protocol implementation. In time and with further experience in such implementation, conclusions reflected in the SIR will also address undeclared nuclear material and nuclear activities in the State as a whole, in addition to the non-diversion of nuclear material.

B. Safeguards Efficiency

91. Efficiency is a measure of how well resources (staff, equipment, money) are used to fulfil the Agency's obligations in the implementation of safeguards, and is a matter of prime importance to States and to the Agency. Efficiency involves a variety of factors, some of which are beyond the Agency's control. Ongoing efforts with regard to integration of safeguards (see paragraphs 128-132) aim at a more effective system within available resources - thereby also a more efficient system.

92. One parameter that can be used to assess efficiency is the monetary cost of safeguards per significant quantity (SQ) of nuclear material. The Background Paper for the 1995 Conference made clear that this has fallen dramatically since 1981 when the cost to verify one SQ was US $2,200 In 1995 the cost was US $460 and in 1998 it was US $400. The reduction is due, in large part, to economies of scale.

C. Responsiveness of Safeguards

93. NPT safeguards agreements impose a number of obligations on the IAEA which oblige it to respect the interests of the State. The final documents of NPT Review Conferences have reflected the importance that States attach to these requirements. In implementing safeguards the IAEA endeavours to satisfy the requirements and to adjust to new and changing circumstances. The following paragraphs summarize the responsiveness to key requirements.

1. Avoiding Undue Interference in States' Peaceful Nuclear Activities

94. IAEA safeguards procedures and practices allow a flexible implementation by adapting the specifics of safeguards activities to the particular circumstances of individual nuclear facilities, thereby meeting the requirements of comprehensive safeguards agreements to avoid hampering the economic and technological development of, and undue

interference in, the States' peaceful nuclear activities. This is also emphasized in the preamble to the Model Additional Protocol.

2. Protecting Commercial and Industrial Secrets and Other Confidential Information

95. NPT safeguards agreements require the IAEA to take every precaution to protect commercial and industrial secrets and other confidential information coming to its knowledge in the implementation of safeguards agreements. The IAEA Statute obliges all staff to refrain from disclosing information coming to their knowledge through their official duties. The IAEA employment contract obliges Agency staff not to disclose such information, an obligation that does not lapse upon termination of employment.

96. Maintaining the confidentiality of information was a matter of great importance to the open-ended Committee of the Board of Governors which negotiated the Model Additional Protocol. Indeed, the document incorporates a specific requirement upon the Agency to maintain a stringent regime to ensure effective protection against disclosure of commercial, technological and industrial secrets and other confidential information coming to its knowledge. A regime for handling and maintaining confidential information was approved by the Board in December 1997.

3. Principles for Recruitment of Staff

97. The IAEA continues to recruit and train its staff in accordance with the precepts of Article VII.D of its Statute which stipulate that the paramount consideration in the recruitment and employment of staff is to "secure employees of the highest standards of efficiency, technical competence and integrity". The importance attached to this has been emphasized in final documents of NPT Conferences.

98. The Statute also pays due regard, subject to the above consideration, to "the importance of recruiting the staff on as wide a geographical basis as possible". The Agency's Safeguards Traineeship Programme contributes towards broadening the geographical base for the recruitment of staff. Each course is an intensive training programme designed to increase the number of qualified candidates from developing countries for Professional safeguards posts. From courses held in 1996 and in 1999, seven trainees (out of twelve) are currently employed as IAEA safeguards inspectors. Other trainees have joined their home countries' SSACs, thereby also contributing to the effectiveness of the safeguards.

99. As of the end of 1999, 286 staff members had been approved by the Board of Governors as safeguards inspectors and inspection assistants. 41% of them were from developing countries. These inspectors and inspection assistants have been recruited from 70 countries, 46 of which are developing countries.

100. In order to maintain the highest professional standards of the safeguards staff, the IAEA carries out extensive inspector training. All inspectors are required to attend an Introductory Course on Agency Safeguards (ICAS). Further training courses include topical training, facility-related training and refresher training. Since 1995, specific training helps

to prepare inspectors for implementing safeguards strengthening measures such as environmental sampling and broad-based information analysis.

101. The IAEA also offers extensive training for Member State personnel in the areas of nuclear material control, accountancy and physical protection. During 1998 for example, such training involved 275 State personnel and a total of 1554 person-days of instruction.

4. Co-operation with State Systems of Accounting and Control (SSAC)

102. Comprehensive safeguards agreements call for co-operation between the IAEA and the States through their SSACs to facilitate the implementation of safeguards. Past NPT Conferences have recognized the importance of State and regional accounting and control systems to effective and efficient safeguards. Keenly aware of the value technically qualified SSACs, the Agency has, for many years, carried out programmes to assist States in the development and implementation of their SSACs, including through the provision of SSAC guidelines and of training courses for SSACs staff.

103. In 1992, a major initiative was taken to improve the efficiency and effectiveness of safeguards implementation in the European Union through new arrangements referred to as the New Partnership Approach (NPA). This was prompted, inter alia, by the desire of both the IAEA and of EURATOM to conserve resources and avoid unnecessary duplication of effort. As stated in the Background Paper for the 1995 NPT Conference, the procedures take into account the requirement of the IAEA to draw independent conclusions.

104. Significant reductions in the Agency's inspection effort have been obtained in the States of the European Union as a result of the NPA and from the shutdown of certain major facilities. Inspection procedures have been revised to avoid duplication, whilst concurrently maintaining IAEA independence. The NPA arrangements include joint use and development of equipment, training, the sharing of on-site analytical capabilities and co-operation during inspections.

105. Co-operation has also increased with the Brazilian-Argentine Agency for Accounting and Control of Nuclear Material (ABACC), resulting in improved efficiency of safeguards implementation. Further, enhanced co-operation is foreseen in a co-operation agreement concluded by the two organizations in 1998, joint procurement and use certain safeguards equipment, shared training and co-ordination of inspection work.

106. An important area of Agency co-operation with State and regional systems, and with facility operators, is the development, testing and implementation of new safeguards approaches and techniques. In recent years co-operation has focused on such issues as environmental sampling, remote monitoring, random inspections, new surveillance equipment and advanced Non Destructive Assay (NDA) equipment.

5. More Cost-effective Inspection Procedures

107. Comprehensive safeguards agreements call for the IAEA to take full account of technical developments in safeguards. The IAEA maintains an active programme, largely in co-operation with Member State Support Programmes, to develop new techniques and improved procedures. New procedures for short notice random inspection and the use of

advanced technology for safeguards equipment are examples of development efforts which are in response to the relevant provisions in safeguards agreements.

6. Concentration of Verification on Weapons-Usable-Nuclear Material

108. As stated before, inspection effort under comprehensive safeguards agreements concentrate on unirradiated plutonium and highly enriched uranium nuclear materials from which nuclear weapons could readily be made. The annual effort to verify one significant quantity (SQ) of unirradiated plutonium or HEU averaged 0.35 person-days of inspection (PDI), while verifying 1 SQ of irradiated nuclear material averaged 0.06 PDI (1998 figures). This much lower value for inspection effort devoted to irradiated nuclear material results from the fact that safeguards on such material can be based on item accountancy safeguards and on extensive use of containment and surveillance.

7. Increased Transparency of IAEA Safeguards

109. The Agency has responded to the calls during the 1995 NPT Conference to improve the transparency of the presentation of the results of IAEA safeguards activities so that information about the results can be made public while concurrently maintaining confidentiality. The Safeguards Implementation Report (SIR) remains the main vehicle through which safeguards results are presented to the IAEA Board of Governors and to Agency Member States. Since 1995, the information content of the SIR has been expanded considerably, and improvements made to make the information more readily comprehensible. An Executive Summary of the SIR, introduced in 1994, is now a regular feature and provides the public at large with more information about IAEA safeguards implementation. Additionally, starting in 1996, the IAEA introduced an Annex to the SIR which gives a summarized description of the main elements of IAEA safeguards. It is updated yearly, and has been developed specifically with a view to readers who might not be familiar with the precepts and procedures of safeguards implementation.

110. Information about the results of safeguards continues to be reflected in the annual safeguards statement. This is made available publicly through the IAEA Annual Report. The Agency continues to give priority to providing more comprehensive information to the general public and has identified a number of relevant areas with this in mind.

8. New and Complex Nuclear Facilities

111. A continuing challenge for the IAEA and Member States has been to prepare for and implement safeguards at new and increasingly complex nuclear facilities. Large commercial enrichment plants employing several different enrichment technologies, large-scale automated reprocessing plants and MOX fuel fabrication plants involving remote handling are examples of nuclear facilities that require extensive safeguards arrangements and where planning such arrangements at an early stage facilitates the subsequent implementation of safeguards.

112. A particular challenge in the next years is preparation for and the implementation of effective safeguards at - one or possibly two - large commercial reprocessing facilities. In this context, in 1997, the Agency established a project to plan, co-ordinate and integrate all the activities necessary to design and implement effective and efficient safeguards,

including the development of the safeguards approach for one reprocessing plant and for the planned, on-site analytical laboratory. The plan stipulates that extensive design information verification is carried out during the construction and commissioning phase and that infrastructure for the implementation of safeguards is established before operations commence. The implementation of safeguards at this complex type of facility will require substantial investment of staff and money. Significant support will be required from Member States.

9. Voluntary Offer Agreements (VOAs) with Nuclear-Weapon States

113. As stated in document NPT/CONF.1995/7 and in paragraph 18 above, NWSs Party to the NPT are not committed by Article III to conclude safeguards agreements with the IAEA. These States have, however, voluntarily offered parts or all or their civilian nuclear fuel cycles for safeguards by the Agency. VOAs have been concluded with each of the five NWSs[9].

114. Universality with regard to the implementation of Agency safeguards in States has been a focus of past NPT Review Conferences. As noted in paragraph 53 above, China, France, the United Kingdom and the United States of America have negotiated and signed Additional Protocols to their respective VOAs.[10]

VI. SAFEGUARDS WORKLOAD AND RESOURCES

A. Workload

115. Since 1995, the number of nuclear facilities and locations outside facilities under safeguards has increased from 885 to 897. They include new power reactors, and facilities for fuel fabrication, uranium enrichment and storage. The number of facilities which were inspected at least once a year increased by 6 %. This reflects the growth in the Agency's overall safeguards work load.

116. Much greater increases have occurred in the quantities of nuclear material under safeguards (Figure 1). The increase which has had the greatest impact on the safeguards work load is in separated plutonium. Since 1995, the quantities of unirradiated plutonium (outside reactor cores) and highly enriched uranium increased about 35%. Material in this "direct use" category requires the most intensive safeguards. Forecasts show no abatement in the projected increases of plutonium and highly enriched uranium quantities, which may well increase further as more reprocessing plants come on stream and, possibly, as additional nuclear material declared excess to military requirements comes under safeguards.

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[9] Between the IAEA and the United Kingdom (1978), the United States (1980), France (1981), the former Soviet Union, now the Russian Federation (1985) and the People's Republic of China (1989).

[10] A draft Additional Protocol for the Russian Federation is expected to be submitted to the Board of Governors for approval shortly.

117. The quantity of irradiated direct-use nuclear material (mostly plutonium) under safeguards has increased by 17% since 1995. The safeguards effort expanded on this is relatively insensitive to increases in total quantity for as long as the material remains in reactor storage ponds. However, as quantities of spent fuel increase, increasing amounts will be transferred to dry storage to which future access will be difficult. Consequently, the Agency will have to verify fuel transfers before the fuel arrives in dry storage. This is a cost-intensive process. During 1998, about 8% of total person-days of inspection were used to verify such transfers.

118. Increases have also occurred in the quantities of indirect-use material under safeguards, including low enriched uranium and source material, although to a lesser extent (2.4%). Increases in these materials do not impose any significant new verification burden.

B. Resources

119. Past NPT Conferences have, inter alia, recognized the need for the IAEA to be provided with the necessary financial and human resources to ensure that the Agency is able to continue to meet its safeguards responsibilities effectively. Specifically, the 1995 Conference made clear that "Every effort should be made to ensure that the IAEA has the financial and human resources necessary in order to meet effectively its responsibilities". Notwithstanding this, and despite increases in the overall amount of nuclear material under safeguards and in the number and the complexity of facilities to be safeguarded, paragraph 57 makes clear that IAEA Member States have continued to apply a policy of "zero real growth" to the IAEA's budget. A few times since 1985 the budget has increased minimally, but such limited resource adjustments cannot keep pace with the increasing work load.

120. Against this background, the Agency has become increasingly dependent on voluntary, extrabudgetary contributions from some of its Member States. Such contributions represented 17% of the total safeguards programme costs for 1998 and is projected to reach 20% in 2001. The Agency Secretariat has made clear to Member States that such heavy reliance on extrabudgetary funds is unsound.

121. Since extrabudgetary funding has been made available for, inter alia, the purchase of equipment, the Agency has been able to use a larger proportion of the regular budget to increase its staff (safeguards inspectors and other Professionals) to keep pace with the increasing workload. However, more than half of this increase was in temporary contracts.

122. The Agency has already made arrangements to carry out Voluntary Offer verification activities, funded by extrabudgetary resources, of nuclear material from the nuclear weapon programme in the United States of America. This was discussed in paragraph 54 above. Paragraph 55 describes the initiative that the USA and the Russian Federation launched in 1996 with the Agency, that would lead to a new verification approach for weapon-origin fissile material enabling the Agency to draw independent and credible conclusions, while ensuring that no classified information could be acquired by the inspectors. In the light of the budgetary situation described above, it is clear that new Agency activities in the area of weapon-origin fissile material will pose a challenge for the Agency, not only in technical terms, but also in terms of resource requirements. For that reason, the Director General presented a paper to the Board in June 1999, with options for financing Agency verification of activities that are related to nuclear arms control and reduction measures including the

option of a separate "Nuclear Arms Control and Reduction Verification Fund". One of the key considerations in the paper was that the funding mechanism needs to be predictable and reliable. The Board had an initial discussion on the subject and interesting proposals were put forward. The discussion is expected to continue when the verification tasks envisaged become more concrete.

C. Workload and Resource Projections in the Near Term

123. The increase in the safeguards workload will continue during the next several years as new facilities come into operation and as States' Additional Protocols come into force. In the latter context, the evaluation of the initial declarations received from States under the Additional Protocol, and of other information available on their nuclear activities, will impose a significant burden but, at this particular juncture, it is impossible to quantify it precisely. In the long run, the Agency is committed to a programme of integrated safeguards, and to maintaining cost-neutrality. However, cost-analysis of new approaches to safeguards show that available resources will be insufficient for the increased workload in the short to medium term.

124. A conservative estimate indicates a need to increase IAEA resources under the regular budget, to ensure reliable funding for the new tasks, and decrease its dependency on extrabudgetary funding. In a few years time, it should be possible to take stock again. Later on, the picture with regard to some of the scenarios described above in this section, should also be clearer, as should be the impact upon resources of Additional Protocols, the integration of safeguards (see paragraphs 128-132), and other changes to the safeguards system.

VII. SAFEGUARDS IN THE FUTURE

125. Previous NPT conferences have expressed or reaffirmed the conviction that IAEA safeguards play a key role in preventing nuclear proliferation. Through providing assurance that States are complying with their safeguards undertakings and by assisting States in demonstrating that compliance, safeguards promote further confidence among States and, as a fundamental element of the NPT, help to strengthen the collective security of the States Party to the Treaty. Parties have commended the IAEA on its implementation of safeguards pursuant to the NPT and urged the Agency to take full advantage of its rights.

126. NPT Conferences have also welcomed the significant contributions made by States Party to the Treaty in facilitating the application of IAEA safeguards and in supporting efforts to enhance the effectiveness and efficiency of safeguards. In this context, the conferences have recognized the critical importance of States continuing their political, technical and financial support for the safeguards system, including playing their full part in helping the IAEA to facilitate the most effective use of its verification resources.

127. The Agency must assume that all of the above considerations continue to apply. Such considerations include support for strengthened safeguards which represent maximum technical effectiveness and cost efficiency.

A. The Integration of Safeguards

128. In the above context, the most important area of current and future work is that on integrating the traditional nuclear material verification activities with new strengthening measures. This is being given the highest priority. The aim is to optimize the combination of all the safeguards measures available to the Agency in order to meet the Agency's safeguards objectives with maximum effectiveness and efficiency on the basis of cost-neutrality. For example in States with a comprehensive safeguards agreement and an Additional Protocol in force, new measures aimed at improving the Agency's ability to provide assurance of the absence of undeclared nuclear material and activities in a State as a whole, in particular those contained in the Model Additional Protocol, may lead to the relaxation of certain traditional measures on less sensitive nuclear material. This may also lead to a reduction in the costs associated with such activities.

129. The Secretariat has elaborated plans and concepts for the development of integrated safeguards that, inter alia, reflect advice provided by the Director General's Standing Advisory Group on Safeguards Implementation (SAGSI) and also takes into account the results of consultants' and experts' meetings and Working Groups. The concept is based on achieving a comprehensive understanding of nuclear activities in States, with the goal of being able to draw safeguards conclusions about the completeness and correctness of States' declarations on nuclear materials and activities. The plan includes the development and evaluation of a generic State-level safeguards approach and its application to specific fuel cycles; a re-examination of some of the basic safeguards implementation parameters (such as timeliness and detection probabilities); an examination of the relative importance of various diversion scenarios; possibilities for further co-operation with State or regional systems of accounting and control of nuclear material; and the drawing, formulation, maintaining and reporting of safeguards conclusions for a State as a whole. The development programme, co-ordinated by the Department of Safeguards, is being undertaken within the Secretariat together with the assistance of a group of experts, with advice from SAGSI and with the help of a number of Member State Support Programmes.

130. The basic principles which govern consideration of the development of integrated safeguards are that:

(a) integrated safeguards must be non-discriminatory, i.e. although the measures used may be different, the same technical objective must be pursued in all States with the same safeguards obligations; and

(b) integrated safeguards should be based on State-wide considerations.

131. The commitment to cost neutrality remains a boundary condition in the development of integrated safeguards.

132. Full implementation of the measures contained in the Additional Protocol will provide the Agency with confidence about the absence of undeclared nuclear material and activities (both at declared locations and elsewhere in a State). Such confidence, reflected in its conclusions, is necessary to start the integration process with possible reduction in inspection effort. Such integration will take into account the synergy between the measures that can be implemented under the Additional Protocol and the traditional safeguards measures. By way of example, the diversion of declared irradiated fuel and the existence of an undeclared reprocessing plant are both part of the same potential path for the acquisition

of nuclear material. Measures to detect either activity contribute to the overall ability of detecting this particular acquisition path.

B. Additional Developmental Work

133. The IAEA does not have the financial resources to carry out its own research and development programme in safeguards; rather it defines its needs, solicits Member State assistance, mostly through formal Member State programmes in support of IAEA safeguards, and oversees progress in development work. Towards these ends, the Agency maintains a Safeguards Development and Implementation Support Programme, that identifies needs for development and safeguards implementation support. The programme is revised every two years.

134. The development programme focuses on conceptual safeguards approaches, the implementation of safeguards at facilities, the development of equipment, and of computer software and on staff training. As can be inferred from paragraphs 128-132 above, an important adjunct is the extensive development effort being put into integrating INFCIRC/153(Corr.) and INFCIRC/540(Corr.) measures into a coherent whole. Field trials, in close co-operation with Member States, are a key feature of the programme.

135. An important part of the development programme has been a cost analysis of the various elements of safeguards implementation, as an indispensable basis for taking decisions with regard to safeguards integration. Cost estimates, with technical performance information, provide a basis for (1) identifying measures which can improve either the effectiveness or efficiency of safeguards and (2) determining the optimum combination of safeguards measures to be implemented within available resources.

C. Action by the States Parties

136. Recognizing the emphasis placed by the NPT Conferences on the need for certain actions to be taken by NPT States to facilitate safeguards implementation by the IAEA, an assessment of some of these actions is presented in the following subsections:

1. The Conclusion of Safeguards Agreements and Additional Protocols

137. NNWS Parties of the NPT are obliged by Article III.4 of the Treaty to conclude a safeguards agreement with the IAEA within 18 months of becoming a Party to the Treaty. As mentioned in paragraph 32, 55 States have not yet met that obligation. The majority of them has never started that process. Even though most of the States involved, as far as it is known to the Agency, do not have nuclear material or activities, the Agency cannot fulfil its responsibilities under the Treaty adequately as long as Parties have not all concluded a safeguards agreement. It should be added that the Agency's ability to provide credible assurance not only about the non-diversion of declared nuclear material but also on the absence of undeclared nuclear material and activities rests crucially upon the conclusion of safeguards agreements, and on the conclusion of Additional Protocols with all Parties.

2. Financial and Technical Support: Member State Support Programmes for IAEA Safeguards

138. Some Member States continue to contribute substantially to the Agency's efforts through dedicated Support Programmes for Agency Safeguards, several of which were established long before the 1995 Conference. To date, 15 Member States[11] and EURATOM have established Support Programmes. In addition, a number of States contribute to safeguards through research and development agreements, contracts, test programmes and field trials.

139. Member States' support is guided by the Agency's Safeguards Development and Implementation Support Programme. Areas in which this support has, over the years, been of primary importance are the development and testing of conceptual safeguards approaches, equipment development and staff training. The financial resources expended by Member States in such activities are significant but difficult to assess. These resources include substantial, "in-kind" contributions.

3. Facilitating Safeguards Implementation

140. Over and above ensuring adequate political, technical and financial support for IAEA safeguards, there are a number of other measures which, if implemented by States, would be of considerable practical value. Some pertinent ones are set out below.

Designation of Inspectors

141. Past NPT Conferences have called upon States Parties to exercise their rights regarding IAEA inspector designation proposals in such a way as to facilitate the most effective use of safeguards manpower. Many States have co-operated in this respect but some States continue to impose restrictions by applying inspector quotas, insisting on reciprocity, being unwilling to accept inspectors of certain nationalities, and significantly delaying their response to inspector designation proposals.

142. That said, the overall situation has gradually improved. Only relatively few States now restrict the number of inspectors, and the number of States noted for long response times in responding to designation requests has been decreasing. Thus, factors such as these have affected the efficient implementation of safeguards in only a few States. It nevertheless remains that, in 1999 for example, some 25 States were taking more than one year to respond to inspector designation proposals and, in the case of seven States, responses to such proposals had been outstanding for more than three years. As of1 January 2000, simplified designation procedures had been accepted voluntarily by 27 States. This had helped to reduce the average time for States' acceptance of designations from 10 months in 1993 to 3 months at the end of 1999. The situation is expected to improve further as Additional Protocols enter into force. Additional Protocols provide for further, simplified and improved procedures for inspector designation as a matter of course.

Visas

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[11] Argentina, Australia, Belgium, Canada, Finland, France, Germany, Hungary, Indonesia, Japan, the Netherlands, Russian Federation, Sweden, the United Kingdom, the United States of America and EURATOM

143. The efficient use of human resources and inspection effort has continued to be adversely affected by restrictions placed by States on the entry of designated inspectors. In this regard, it is noteworthy that, short notice or no notice inspections, which are among the key elements of the strengthened safeguards regime, cannot be carried out when restrictive visa requirements are in place.

144. The basis on which individual States issue visas to Agency inspectors continues to vary considerably. Whereas some States are prepared to grant inspectors multiple-entry visas of limited duration, others insist on single entry visas. By the end of 1999, 27 States had agreed to provide designated inspectors with multiple-entry visas, 22 of them for a period of one year or more, and 30 States did not require inspectors to have visas. The entry into force of Additional Protocols which provide the issuance of one-year multiple entry and transit visas within one month of request will further stream line the process of issuing visas.

Quality of States' Declarations under Additional Protocols

145. The efficiency with which the Agency can discharge its obligations under Additional Protocols depends critically upon the quality of States' declarations pursuant to its Article 2 and the updates they are required to provide pursuant to its Article 3. The more accurate and comprehensive these declarations and updates, the higher the quality of the Agency's analysis, evaluation and assessment. As a result, less time will need to be spent in requesting clarifications and amplifications, on bringing questions or inconsistencies to the attention of a State, and, as a consequence, on complementary access activities. As stated, the IAEA has developed special guidelines and formats for declarations under the Additional Protocol and has also developed computer software to help in this regard, which it has made available to Member States at no cost.

CONCLUSIONS

146. IAEA safeguards concepts, objectives, approaches and implementation have evolved progressively as a result of a mix of political evolutions and technological developments. Two of the major milestones in this evolution have been the entry into force of the NPT in 1970 and the decision to develop a strengthened safeguards system as a result of the experiences in Iraq. Substantial efforts and progress towards strengthening safeguards have been made since the 1995 Review and Extension Conference. They have focused in particular on enhancing the IAEA's capability to detect the existence of any undeclared nuclear material and activities, and on improving safeguards effectiveness whilst concurrently seeking to improve cost-efficiency.

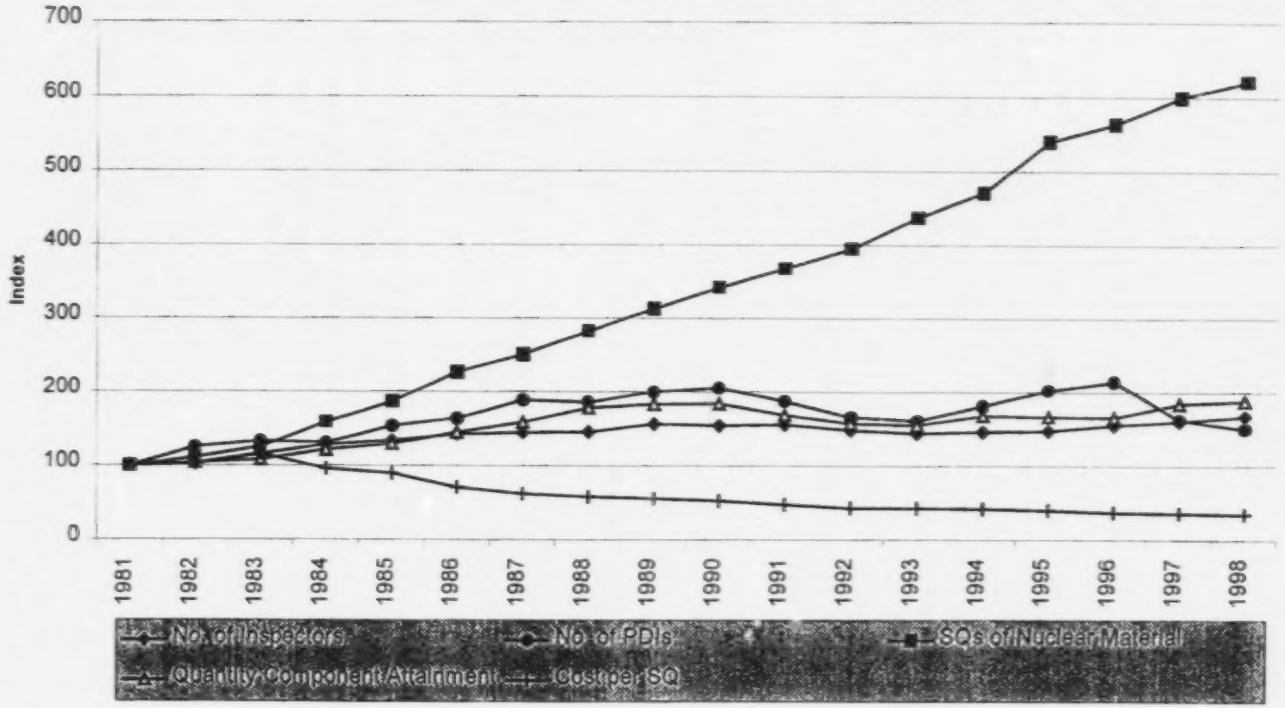
147. A high point in the evolution of strengthening safeguards was the adoption of the Model Additional Protocol by the Board of Governors in May 1997, which provides for more information about a State's nuclear material and activities and greater access to locations at which nuclear material is or could be present. The strengthening process will gain ground as more and more States bring Additional Protocols into force. Much remains to be accomplished in this regard, starting with the entry into force of all outstanding comprehensive safeguards agreements and the conclusions of Additional Protocols by all non-nuclear-weapon States Party to the NPT.

148. The ultimate success of the collective safeguards strengthening efforts will depend, above all else, on the extent to which States Party to the NPT grant the IAEA the requisite authority, co-operation and resources to verify effectively and efficiently that States Party to the NPT are honouring their non-proliferation undertakings.

ANNEXES

Figure 1

Figure 1. Agency Resources, Utilization and Results



Annex 1

"Principles and Objectives for Nuclear Non-Proliferation and Disarmament" as Relevant to IAEA Safeguards

"6. The development of nuclear-weapon-free zones, especially in regions of tension such as in the Middle East, as well as the establishment of zones free of all weapons of mass destruction should be encouraged as a matter of priority, taking into account the specific characteristics of each region. The establishment of additional nuclear-weapon-free zones by the time of the Review Conference in the year 2000 would be welcome."

"9. The IAEA is the competent authority responsible to verify and assure, in accordance with the statute of the IAEA and the Agency's safeguards system, compliance with its safeguards agreements with States Parties undertaken in fulfillment of their obligations under article III(1) of the Treaty, with a view of preventing diversion of nuclear material from peaceful uses to nuclear weapons or other nuclear explosive devices. Nothing should be done to undermine the authority of the IAEA in this regard. States Parties that have concerns regarding non-compliance with the safeguards agreements of the Treaty by the States Parties should direct such concerns, along with supporting evidence and information, to the IAEA to consider, investigate, draw conclusions and decide on necessary actions in accordance with its mandate.

10. All States Parties required by article III of the Treaty to sign and bring into force comprehensive safeguards agreements and which have not yet done so should do so without delay.

11. IAEA safeguards should be regularly assessed and evaluated. Decisions adopted by its Board of Governors aimed at further strengthening the effectiveness of IAEA safeguards should be supported and implemented and the IAEA's capability to detect undeclared nuclear activities should be increased. Also States not Party to the Treaty on the Non-Proliferation of Nuclear Weapons should be urged to enter into comprehensive safeguards agreements with the IAEA.

12. New supply arrangements for the transfer of source or special fissionable material or equipment or material especially designed or prepared for the processing, use or production of special fissionable material to non-nuclear weapon States should require, as a necessary precondition, acceptance of IAEA full-scope safeguards and internationally legally binding commitments not to acquire nuclear weapons or other nuclear explosive devices.

13. Nuclear fissile material transferred from military use to peaceful nuclear activities should, as soon as practicable, be placed under IAEA safeguards in the framework of the voluntary safeguards agreements in place with the nuclear-weapon States. Safeguards should be universally applied once the complete elimination of nuclear weapons has been achieved."

"19. Every effort should be made to ensure that the IAEA has the financial and human resources necessary in order to meet effectively its responsibilities in the areas of technical co-operation, safeguards and nuclear safety."

Annex 2

Growth in the number of States having safeguards agreements in force with the Agency

	1975	1980	1985	1990	1995	1999
Total number of States with safeguards agreements in force	64	86	96	104	125	139
Total number of States with NPT safeguards agreements in force*	46	69	78	86	108	127
Total number of safeguards agreements in force	106	139	163	177	207	223
Total number of NPT safeguards agreements in force*	46	65	74	81	101	118

* The number of States with NPT safeguards agreements is higher than the number of NPT safeguards agreements, inter alia, because the NNWSs of the European Union have collectively one safeguards agreement.

SITUATION ON 31 DECEMBER 1999 WITH RESPECT TO THE CONCLUSION OF SAFEGUARDS AGREEMENTS BETWEEN THE AGENCY AND NON-NUCLEAR-WEAPON STATES IN CONNECTION WITH NPT

Non-nuclear-weapon States which have signed, ratified, acceded to or succeeded to NPT[a] (1)	Date of ratification, accession or succession[a] (2)	Safeguards agreement with the Agency (3)	INFCIRC (4)
Afghanistan	4 February 1970	In force: 20 February 1978	257
Albania[b]	12 September 1990		
Algeria	12 January 1995	In force: 7 January 1997	531
Andorra	7 June 1996		
Angola	14 October 1996		
Antigua and Barbuda[c]	27 November 1968	In force: 9 September 1996	528
Argentina[d]	10 February 1995	In force: 18 March 1997	435/Mod.1
Armenia	15 July 1993	In force: 5 May 1994	455
Australia	23 January 1973	In force: 10 July 1974	217
Austria[e]	27 June 1969	Accession: 31 July 1996	193
Azerbaijan	22 September 1992	In force: 29 April 1999	580
Bahamas[c]	10 July 1973	In force: 12 September 1997	544
Bahrain	3 November 1988		
Bangladesh	31 August 1979	In force: 11 June 1982	301
Barbados[c]	21 February 1980	In force: 14 August 1996	527
Belarus	22 July 1993	In force: 2 August 1995	495
Belgium	2 May 1975	In force: 21 February 1977	193
Belize[f]	9 August 1985	In force: 21 January 1997	532
Benin	31 October 1972		
Bhutan	23 May 1985	In force: 24 October 1989	371
Bolivia[c]	26 May 1970	In force: 6 February 1995	465
Bosnia and Herzegovina[g]	15 August 1994	In force: 28 December 1973	204
Botswana	28 April 1969		
Brazil[h]	18 September 1998	In force: 20 September 1999	435/Mod. 3
Brunei Darussalam	26 March 1985	In force: 4 November 1987	365
Bulgaria	5 September 1969	In force: 29 February 1972	178
Burkina Faso	3 March 1970		
Burundi	19 March 1971		
Cambodia	2 June 1972	Signed: 17 December 1999	
Cameroon	8 January 1969	Signed: 21 May 1992	
Canada	8 January 1969	In force: 21 February 1972	164
Cape Verde	24 October 1979		
Central African Republic	25 October 1970		
Chad	10 March 1971		
Chile[i]	25 May 1995	In force: 9 September 1996	476/Mod.1
Colombia[j]	8 April 1986		
Comoros	4 October 1995		
Congo	23 October 1978		
Costa Rica[c]	3 March 1970	In force: 22 November 1979	278
Côte d'Ivoire	6 March 1973	In force: 8 September 1983	309
Croatia	29 June 1992	In force: 19 January 1995	463
Cyprus	10 February 1970	In force: 26 January 1973	189
Czech Republic[k]	1 January 1993	In force: 11 September 1997	541
Democratic People's Republic of Korea	12 December 1985	In force: 10 April 1992	403
Democratic Republic of the Congo	4 August 1970	In force: 9 November 1972	183
Denmark[l]	3 January 1969	In force: 21 February 1977	193
Djibouti	16 October 1996		
Dominica[f]	10 August 1984	In force: 3 May 1996	513
Dominican Republic[c]	24 July 1971	In force: 11 October 1973	201
Ecuador[c]	7 March 1969	In force: 10 March 1975	231
Egypt	26 February 1981	In force: 30 June 1982	302
El Salvador[c]	11 July 1972	In force: 22 April 1975	232
Equatorial Guinea	1 November 1984	Approved by the Board, June 1986	
Eritrea	16 March 1995		
Estonia	7 January 1992	In force: 24 November 1997	547
Ethiopia	5 February 1970	In force: 2 December 1977	261

Fiji	14 July 1972	In force: 22 March 1973	192
Finland[m]	5 February 1969	Accession: 1 October 1995	193
Gabon	19 February 1974	Signed: 3 December 1979	
Gambia	12 May 1975	In force: 8 August 1978	277
Georgia	7 March 1994	Signed: 29 September 1997	
Germany[n]	2 May 1975	In force: 21 February 1977	193
Ghana	4 May 1970	In force: 17 February 1975	226
Greece[o]	11 March 1970	Accession: 17 December 1981	193
Grenada[c]	19 August 1974	In force: 23 July 1996	525
Guatemala[c]	22 September 1970	In force: 1 February 1982	299
Guinea	29 April 1985		
Guinea-Bissau	20 August 1976		
Guyana[c]	19 October 1993	In force: 23 May 1997	543
Haiti[c]	2 June 1970	Signed: 6 January 1975	
Holy See	25 February 1971	In force: 1 August 1972	187
Honduras[c]	16 May 1973	In force: 18 April 1975	235
Hungary	27 May 1969	In force: 30 March 1972	174
Iceland	18 July 1969	In force: 16 October 1974	215
Indonesia	12 July 1979	In force: 14 July 1980	283
Iran, Islamic Republic of	2 February 1970	In force: 15 May 1974	214
Iraq	29 October 1969	In force: 29 February 1972	172
Ireland	1 July 1968	In force: 21 February 1977	193
Italy	2 May 1975	In force: 21 February 1977	193
Jamaica[c]	5 March 1970	In force: 6 November 1978	265
Japan	8 June 1976	In force: 2 December 1977	255
Jordan	11 February 1970	In force: 21 February 1978	258
Kazakhstan	14 February 1994	In force: 11 August 1995	504
Kenya	11 June 1970		
Kiribati	18 April 1985	In force: 19 December 1990	390
Korea, Republic of	23 April 1975	In force: 14 November 1975	236
Kuwait	17 November 1989	Signed: 10 May 1999	
Kyrgyzstan	5 July 1994	Signed: 18 March 1998	
Lao People's Democratic Republic	20 February 1970	Signed: 22 November 1991	
Latvia	31 January 1992	In force: 21 December 1993	434
Lebanon	15 July 1970	In force: 5 March 1973	191
Lesotho	20 May 1970	In force: 12 June 1973	199
Liberia	5 March 1970		
Libyan Arab Jamahiriya	26 May 1975	In force: 8 July 1980	282
Liechtenstein	20 April 1978	In force: 4 October 1979	275
Lithuania	23 September 1991	In force: 15 October 1992	413
Luxembourg	2 May 1975	In force: 21 February 1977	193
Madagascar	8 October 1970	In force: 14 June 1973	200
Malawi	18 February 1986	In force: 3 August 1992	409
Malaysia	5 March 1970	In force: 29 February 1972	182
Maldives	7 April 1970	In force: 2 October 1977	253
Mali	10 February 1970		
Malta	6 February 1970	In force: 13 November 1990	387
Marshall Islands	30 January 1995		
Mauritania	26 October 1993		
Mauritius	8 April 1969	In force: 31 January 1973	190
Mexico[c]	21 January 1969	In force: 14 September 1973	197
Micronesia, Federated States of	14 April 1995		
Monaco	13 March 1995	In force: 13 June 1996	524
Mongolia	14 May 1969	In force: 5 September 1972	188
Morocco	27 November 1970	In force: 18 February 1975	228
Mozambique	4 September 1990		
Myanmar	2 December 1992	In force: 20 April 1995	477
Namibia	2 October 1992	In force: 15 April 1998	551
Nauru	7 June 1982	In force: 13 April 1984	317
Nepal	5 January 1970	In force: 22 June 1972	186
Netherlands[p]	2 May 1975	In force: 21 February 1977	193
New Zealand[q]	10 September 1969	In force: 29 February 1972	185
Nicaragua[c]	6 March 1973	In force: 29 December 1976	246
Niger	9 October 1992		
Nigeria	27 September 1968	In force: 29 February 1988	358
Norway	5 February 1969	In force: 1 March 1972	177
Oman	23 January 1997	Approved by the Board	

		20 September 1999	
Palau, Republic of	14 April 1995		
Panama[c,f]	13 January 1977	Signed: 22 December 1988	
Papua New Guinea	13 January 1982	In force: 13 October 1983	312
Paraguay[c]	4 February 1970	In force: 20 March 1979	279
Peru[c]	3 March 1970	In force: 1 August 1979	273
Philippines	5 October 1972	In force: 16 October 1974	216
Poland	12 June 1969	In force: 11 October 1972	179
Portugal[s]	15 December 1977	Accession: 1 July 1986	193
Qatar	3 April 1989		
Republic of Moldova	11 October 1994	Signed: 14 June 1996	
Romania	4 February 1970	In force: 27 October 1972	180
Rwanda	20 May 1975		
St. Kitts and Nevis[f]	22 March 1993	In force: 7 May 1996	514
St. Lucia[f]	28 December 1979	In force: 2 February 1990	379
St. Vincent and the Grenadines[f]	6 November 1984	In force: 8 January 1992	400
Samoa	17 March 1975	In force: 22 January 1979	268
San Marino	10 August 1970	In force: 21 September 1998	575
São Tome and Principe	20 July 1983		
Saudi Arabia	3 October 1988		
Senegal	17 December 1970	In force: 14 January 1980	276
Seychelles	12 March 1985		
Sierra Leone	26 February 1975	Signed: 10 November 1977	
Singapore	10 March 1976	In force: 18 October 1977	259
Slovakia[t]	1 January 1993	In force: 3 March 1972	173
Slovenia	7 April 1992	In force: 1 August 1997	538
Solomon Islands	17 June 1981	In force: 17 June 1993	420
Somalia	5 March 1970		
South Africa	10 July 1991	In force: 16 September 1991	394
Spain	5 November 1987	Accession: 5 April 1989	193
Sri Lanka	5 March 1979	In force: 6 August 1984	320
Sudan	31 October 1973	In force: 7 January 1977	245
Suriname[c]	30 June 1976	In force: 2 February 1979	269
Swaziland	11 December 1969	In force: 28 July 1975	227
Sweden[u]	9 January 1970	Accession: 1 June 1995	193
Switzerland	9 March 1977	In force: 6 September 1978	264
Syrian Arab Republic	24 September 1969	In force: 18 May 1992	407
Tajikistan	17 January 1995		
Thailand	7 December 1972	In force: 16 May 1974	241
The Former Yugoslav Republic of Macedonia	30 March 1995		
Togo	26 February 1970	Signed: 29 November 1990	
Tonga	7 July 1971	In force: 18 November 1993	426
Trinidad and Tobago[c]	30 October 1986	In force: 4 November 1992	414
Tunisia	26 February 1970	In force: 13 March 1990	381
Turkey	17 April 1980	In force: 1 September 1981	295
Turkmenistan	29 September 1994		
Tuvalu	19 January 1979	In force: 15 March 1991	391
Uganda	20 October 1982		
Ukraine	5 December 1994	In force: 22 January 1998	550
United Arab Emirates	26 September 1995		
United Republic of Tanzania	31 May 1991	Signed: 26 August 1992	
Uruguay[c]	31 August 1970	In force: 17 September 1976	157
Uzbekistan	7 May 1992	In force: 8 October 1994	508
Vanuatu	24 August 1995		
Venezuela[c]	25 September 1975	In force: 11 March 1982	300
Viet Nam	14 June 1982	In force: 23 February 1990	376
Yemen, Republic of	1 June 1979		
Yugoslavia[v], Federal Republic of	4 March 1970	In force: 28 December 1973	204
Zambia	15 May 1991	In force: 22 September 1994	456
Zimbabwe	26 September 1991	In force: 26 June 1995	483

[a] The information in columns (1) and (2) was provided to the Agency by depositary governments of NPT, and an entry in column (1) does not imply the expression of any opinion on the part of the Secretariat concerning the legal status of any country or territory or of

its authorities, or concerning the delimitation of its frontiers. The table does not contain information relating to the participation of Taiwan, China, in NPT.

b

A sui generis comprehensive safeguards agreement with Albania entered into force on 25 March 1988 (INFCIRC/359).

c

The relevant safeguards agreement refers to both NPT and the Treaty of Tlatelolco.

d

An exchange of letters has taken place between Argentina and the Agency confirming that the safeguards agreement concluded between Argentina, Brazil, ABACC and the Agency for the application of safeguards which entered into force on 4 March 1994 (INFCIRC/435) satisfies the requirements of Argentina under Article III of the NPT to conclude a safeguards agreement with the Agency. The exchange of letters entered into force on the date of approval by the Board of Governors.

e

The application of safeguards in Austria under the NPT safeguards agreement INFCIRC/156, in force since 23 July 1972, was suspended on 31 July 1996, on which date the agreement of 5 April 1973 (INFCIRC/193) between the non-nuclear-weapon States of EURATOM, EURATOM and the Agency, to which Austria had acceded, entered into force for Austria.

f

An exchange of letters has taken place between this State and the Agency confirming that the NPT safeguards agreement concluded with the State satisfies the obligations of the State under Article 13 of the Treaty of Tlatelolco to conclude a safeguards agreement with the Agency.

g

The NPT safeguards agreement concluded with the Socialist Federal Republic of Yugoslavia (INFCIRC/204), which entered into force on 28 December 1973, continues to be applied in Bosnia and Herzegovina to the extent relevant to the territory of Bosnia and Herzegovina.

h

The Board of Governors has concluded that the agreement between Argentina, Brazil, the ABACC and the Agency for the application of safeguards which entered into force on 4 March 1994 (INFCIRC/435) is compatible with the Treaty of Tlatelolco and the NPT.

i

An exchange of letters has taken place between this State and the Agency confirming that the safeguards agreement concluded with the State pursuant to the Treaty of Tlatelolco satisfies the requirements of the obligations of the State under Article III of the NPT to conclude a safeguards agreement with the Agency. The exchange of letters entered into force on the date of approval by the Board of Governors.

j

A comprehensive safeguards agreement with Colombia concluded pursuant to the Treaty of Tlatelolco entered into force on 22 December 1982 (INFCIRC/306).

k

The NPT safeguards agreement concluded with the Czechoslovak Socialist Republic (INFCIRC/173), which entered into force on 3 March 1972, continued to be applied in the Czech Republic to the extent relevant to the territory of the Czech Republic until 11 September 1997, on which date the NPT safeguards agreement concluded with the Czech Republic entered into force.

l

The NPT safeguards agreement with Denmark (INFCIRC/176), in force since 1 March 1972, has been replaced by the agreement of 5 April 1973 between the non-nuclear-weapon States of EURATOM, EURATOM and the Agency (INFCIRC/193) but still applies to the Faroe Islands. Upon Greenland's secession from EURATOM as of 31 January 1985, the Agreement between the Agency and Denmark (INFCIRC/176) re-entered into force as to Greenland.

m

The application of safeguards in Finland under the NPT safeguards agreement INFCIRC/155, in force since 9 February 1972, was suspended on 1 October 1995, on which date the agreement of 5 April 1973 (INFCIRC/193) between the non-nuclear-weapon States of EURATOM, EURATOM and the Agency, to which Finland had acceded, entered into force for Finland.

n

The NPT safeguards agreement of 7 March 1972 concluded with the German Democratic Republic (INFCIRC/181) is no longer in force with effect from 3 October 1990, on which date the German Democratic Republic acceded to the Federal Republic of Germany.

o

The application of safeguards in Greece under the NPT safeguards agreement INFCIRC/166, provisionally in force since 1 March 1972, was suspended on 17 December 1981, on which date Greece acceded to the agreement of 5 April 1973 (INFCIRC/193) between the non-nuclear-weapon States of EURATOM, EURATOM and the Agency.

p

An agreement had also been concluded in respect of the Netherlands Antilles (INFCIRC/229). This agreement entered into force on 5 June 1975.

q

The NPT safeguards agreement with New Zealand (INFCIRC/185) also applies to Cook Islands, Niue and Tokelau.

r

A comprehensive safeguards agreement with Panama concluded pursuant to the Treaty of Tlatelolco entered into force on 23 March 1984 (INFCIRC/316).

s

The application of safeguards in Portugal under the NPT safeguards agreement INFCIRC/272, in force since 14 June 1979, was suspended on 1 July 1986, on which date Portugal acceded to the agreement of 5 April 1973 (INFCIRC/193) between the non-nuclear-weapon States of EURATOM, EURATOM and the Agency.

t

The NPT safeguards agreement concluded with the Czechoslovak Socialist Republic (INFCIRC/173), which entered into force on 3 March 1972, continues to be applied in Slovakia to the extent relevant to the territory of Slovakia. A new NPT safeguards agreement concluded with Slovakia was approved by the Board of Governors on 14 September 1998.

u

The application of safeguards in Sweden under the NPT safeguards agreement INFCIRC/234, in force since 14 April 1975, was suspended on 1 June 1995, on which date the agreement of 5 April 1973 (INFCIRC/193) between the non- nuclear-weapon States of EURATOM, EURATOM and the Agency, to which Sweden had acceded, entered into force for Sweden.

v

The NPT safeguards agreement concluded with the Socialist Federal Republic of Yugoslavia (INFCIRC/204), which entered into force on 28 December 1973, continues to be applied in the Federal Republic of Yugoslavia to the extent relevant to the territory of the Federal Republic of Yugoslavia.

Annex 4

Situation on 31 December 1999 with respect to the conclusion of Additional Protocols

State	Board Approval	Signed	Entered into force
Armenia	9-23-97	9-29-97	
Australia	9-23-97	9-23-97	12-12-97
Austria	6-11-98		
Belgium[1]	6-11-98	9-22-98	
Bulgaria	9-14-98	9-24-98	
Canada	6-11-98	9-24-98	
China	11-25-98	12-31-98	
Croatia	9-14-98	9-22-98	
Cuba	9-20-99	10-15-99	
Cyprus	11-25-98	7-29-99	
Czech Republic	9-20-99	9-28-99	
Denmark[1]	6-11-98	9-22-98	
Ecuador	9-20-99	10-1-99	
Finland[1]	6-11-98	9-22-98	
France[1]	6-11-98	9-22-98	
Georgia	9-23-97	9-29-97	
Germany[1]	6-11-98	9-22-98	
Ghana	6-11-98	6-12-98	*provisional*
Greece[1]	6-11-98	9-22-98	
Holy See	9-14-98	9-24-98	9-24-98
Hungary	9-25-98	11-26-98	
Indonesia	9-20-99	9-29-99	9-29-99
Ireland	6-11-98	9-22-98	
Italy[1]	6-11-98	9-22-98	
Japan	6-11-98	12-09-98	12-16-99
Jordan	3-18-98	7-28-98	7-28-98
Latvia	12-01-97	3-11-98	
Luxembourg[1]	6-11-98	9-22-98	
Monaco	11-26-98	9-30-99	9-30-99
Netherlands[1]	6-11-98	9-22-98	

Norway	3-24-99	9-29-99	
Philippines	9-23-97	9-30-97	
Portugal[1]	6-11-98	9-22-98	
Romania	6-9-99	6-11-99	
Slovenia	11-25-98	11-26-98	
Sweden[1]	6-11-98	9-22-98	
US	6-11-98	6-12-98	
Uzbekistan	9-14-98	9-22-98	12-21-98
Totals	**46**	**45**	**8**

[1]All 15 EU States have concluded APs with EURATOM and the Agency